

ECHO-A				
Power Connection	Nominal	max	min	Connector Type
Power Supply	5V DC	5.25	4.5	USB-C
Power Consumption	10W	15	0.9225	
Ethernet Connection				
Suggested Adapter				USB 3.0
MAIN 50 PIN CONNECTOR	Nominal	mx	min	PIN #
CRANK+ (*)	5V	2.2 .. 5.5V	-0.5 .. 1.5V	2
CRANK -	GND			4
CAM + (*)	5V	2.2 .. 5.5V	-0.5 .. 1.5V	6
CAM -	0V			7
AI0+	0 .. 10V	15	0	50
AI0-	-10 .. 0V	0	-15	49
AI1+	0 .. 10V	15	0	48
AI1-	-10 .. 0V	0	-15	47
AI2+	0 .. 10V	15	0	46
AI2-	-10 .. 0V	0	-15	45
AI3+	0 .. 10V	15	0	44
AI3-	-10 .. 0V	0	-15	43
AI4+	0 .. 10V	15	0	20
AI4-	-10 .. 0V	0	-15	17
AI5+	0 .. 10V	15	0	19
AI5-	-10 .. 0V	0	-15	21
AI6+	0 .. 10V	15	0	22
AI6-	-10 .. 0V	0	-15	23
AI7+	0 .. 10V	15	0	26
AI7-	-10 .. 0V	0	-15	24
CAN LOW				27
CAN HIGH				28
Sampling resolution - Base	50kHz / 0.5deg			
Sampling resolution - Advanced	200kHz / 0.1deg			
Max RPM	7000			
PROCESSOR				
CPU	Quad Core Cortex-A72; 64-bit SoC @1.5GHz			
RAM	2GB LPDDR4; 2400 SDRAM			
STORAGE	16GB			
OS	Linux Based			

ENGINE **CONTROLLER** HIGH SPEED OVERSIGHT UNIT

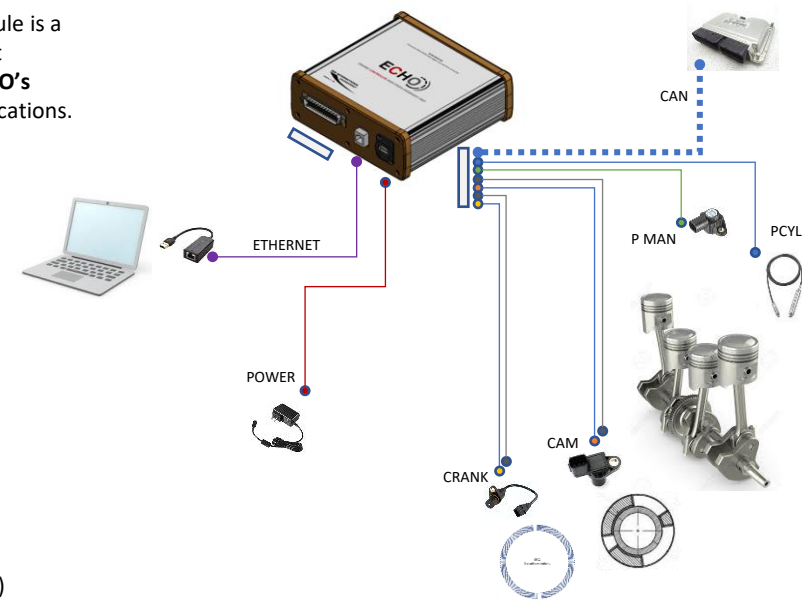
ECHO

Quick Start Guide Ver 01
10 August 2020



1 OVERVIEW

The **ENGINE CONTROLLER HIGH SPEED OVERSIGHT UNIT** or **ECHO** module is a powerful **COMBUSTION DIAGNOSTICS** tool. It is designed to perform fast calculations and allow real time combustion feedback. Additionally, **ECHO's** architecture is open to allow the user to tailor the code for specific applications.



2 KIT CONTENT

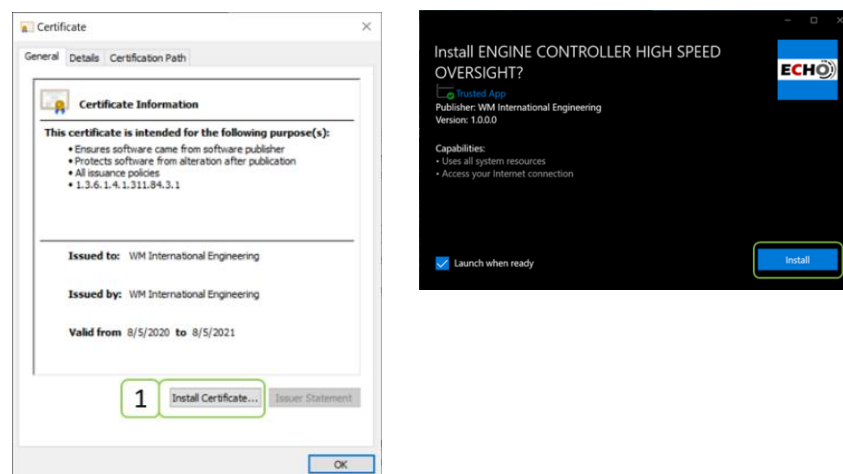
- The kit includes:
1. **ECHO** module
 2. Power Cable
 3. ETHERNET to USB 3.0 adapter
 4. ETHERNET cable

- User requirements:
1. CAM and CRANK
 2. Cylinder Pressure Sensor Input (up to eight channels on base module)
 3. Manifold pressure sensor connection (optional)
 4. CAN cable (optional)

3 SOFTWARE INSTALLATION

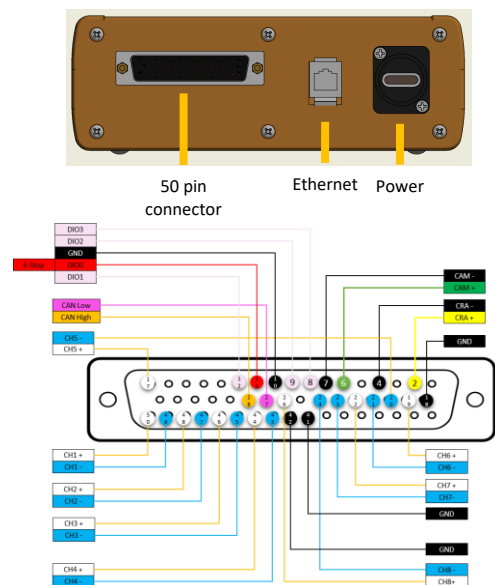
- Files needed are:
- (1) **ECHO** certificate installation (first time users only)
 - (2) **ECHO** APP installer

Files accessed at www.wminternational-engineering.com/ECHO



4 POWER UP AND CONNECTING TO ECHO

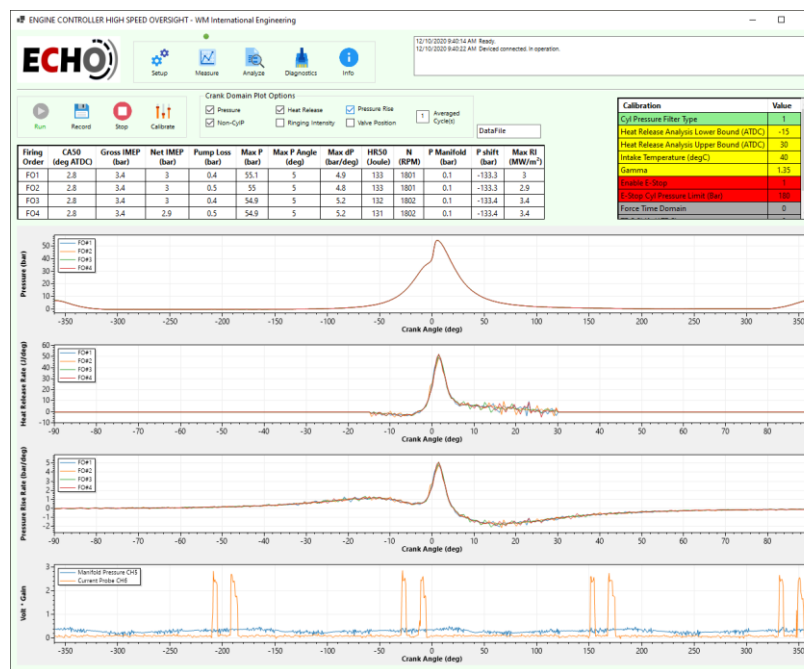
1. Power up **ECHO** via a 5V DC USB-C connector.
2. Connect the Ethernet to PC.
If using an adapter, use the USB 3.0 adapter from the kit.
3. Connect CAM and CRANK signals using the 50 pin harness provided
See #7 for sensor configuration.
4. Connect the analog signals.
Cylinder pressures
Injector current traces
Fuel injection pressures
Manifold pressure
...
5. Connect the CAN cable to ECU.
Connection used to provide combustion feedback to the controller.



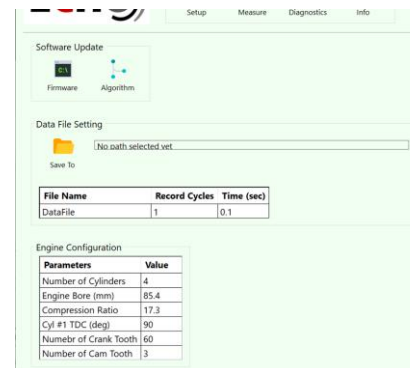
5 CONNECT AND RUN

Power up the **ECHO** box, connect it to the PC, and press the Play button. If the connection is successful, status bar will indicate that **ECHO** is "Running".

- The **measure page** allows the user to:
- ✓ to connect to **ECHO**,
 - ✓ view/record data,
 - ✓ calibrate combustion analysis parameters



- The **setup page** allows the user to:
- ✓ perform software update,
 - ✓ change data file settings,
 - ✓ view engine configuration



- The **diagnostic page** allows the user to troubleshoot:
- ✓ connection issues
 - ✓ engine synchronization issues

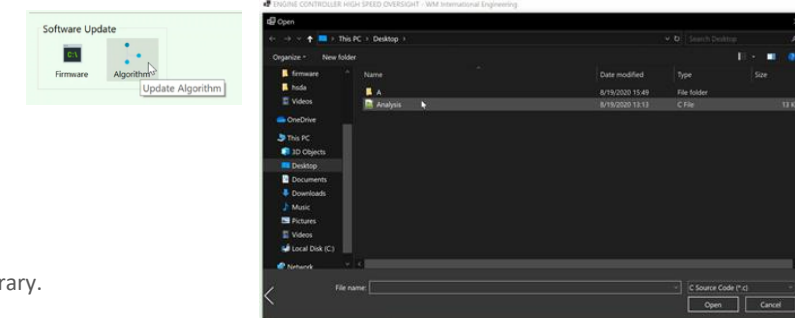
Serial Number	Firmware Version	State	Last Fault	Sync Attempts	Sync Failures	CAN Sent	CAN Failed
L18P8GPJ	1100	RUNNING	NO_ERROR	1	0	6950	0

6 MODIFY ANALYSIS CODE

Users can modify the default combustion analysis C source code **Analysis.c** and upload to **ECHO** via the PC software:

- Press the **Algorithm** button on the **Setup** page as show here
- Select the **Analysis.c** file in popup window as shown
- Click "Open".

File will be uploaded to **ECHO** and recompiled with its embedded library.



7 USER SPECIFIC SETTINGS

CAM and CRANK sensor
ECHO can be set up to process a wide variety of VRS and HALL effect sensors via jumper settings within the box module. Please contact WM International with your system requirements.

FILTER SETTINGS
The default filters applied are 25kHz. Filters are applied to limit signal noise. **FILTER SETTINGS** may be adjusted per user request.